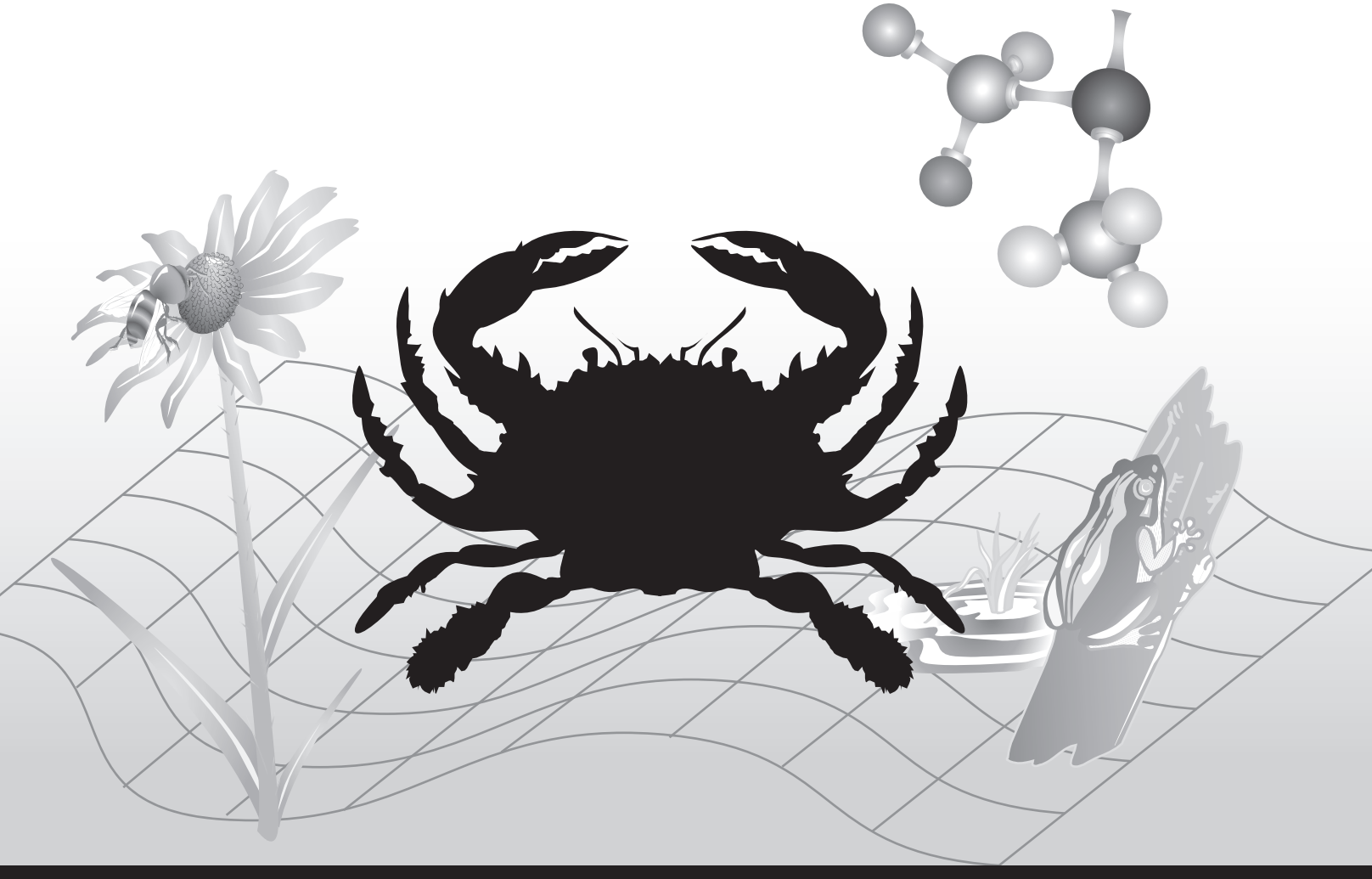
HSA

Maryland High School Assessment

Maryland State Department of Education

Achievement Matters Most



BIOLOGY

Public Release 2009

ISD8813

Sample A

Which of these instruments should a student use to measure the length of a housefly?

A microscope

B metric ruler

C funnel

D graduated cylinder

Sample B

Which of these systems directly provides support for the human body?

F skeletal

G excretory

H endocrine

J reproductive

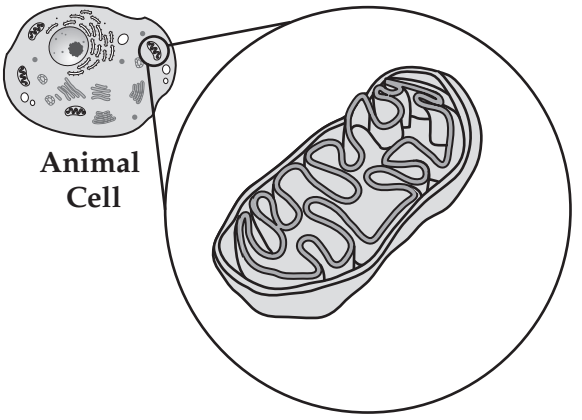
STOP

Directions

Use the information and diagram below to answer Numbers 1 and 2.

Animal cells contain an organelle that helps release energy. A diagram of this organelle is shown below.

ANIMAL CELL DIAGRAM



1 **What is the organelle described?**

A chloroplast

B mitochondrion

C nucleus

D ribosome

2 **Which function would the energy-releasing organelle most likely have in the animal cell?**

F cellular control

G cellular respiration

H removal of wastes

J storage of nutrients

3 **A biologist is using a microscope to observe a very small organism with the low-power 10X lens. If the biologist switches to the 40X lens, how will the appearance of this organism change?**

A It will appear 4 times larger.

B It will appear 40 times larger.

C It will appear 50 times larger.

D It will appear 400 times larger.

4 **In the early 1900s, many children had a disease called rickets. Research showed that the children had a deficiency of a vitamin that is necessary for the proper formation of bones.**

Which of these vitamins was lacking in the diets of these children?

F vitamin A

G vitamin C

H vitamin D

J vitamin K

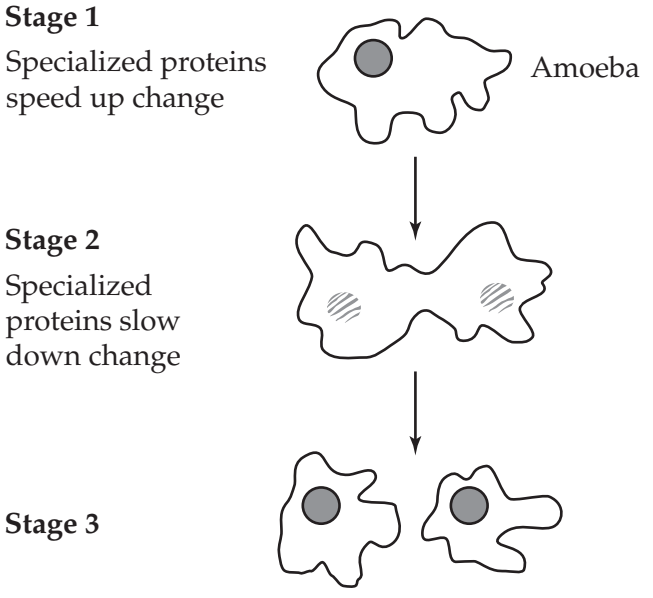
GO ON

Directions

Use the information and the diagram below to answer Numbers 5 through 7.

The diagram below shows stages of cell division of an amoeba, a unicellular organism.

CELL DIVISION IN AN AMOEBA



Scientists have found that the rate of division in amoebas is controlled. Scientists believe that the transition from stage 2 to stage 3 is slowed by proteins. The additional time seems to help the amoeba change coding errors caused during DNA replication.

5 **How does the chromosome number of the amoeba in stage 1 compare to an amoeba in stage 3?**

A half the number of chromosomes

B the same number of chromosomes

C twice the number of chromosomes

D four times the number of chromosomes

6 **Which of these is most likely to be found in amoebas that do not have a sufficient delay between stage 2 and stage 3?**

F mutations

G competition

H pH imbalances

J selection pressures

7 **Specialized proteins control cell division in the amoeba. Which cell part is responsible for making these proteins?**

A mitochondrion

B nucleus

C pseudopod

D ribosome

8 **A cell is observed through a microscope. The cell is found to have a cell wall, a cell membrane, and numerous ribosomes. The cell does not have a nucleus. This cell is most likely from a**

F bacterium

G fungus

H plant

J protist

9 **Which of these is a function of the circulatory system in a mammal?**

A the release of energy

B the regulation of temperature

C the movement of organelles

D the transmission of electrical impulses

10 **The table below compares the size of a bacterium and a virus.**

SIZE COMPARISON

Structure	Measurement (m)
Bacterium	1×10^{-6}
Virus	1×10^{-11}

How many times larger is the bacterium than the virus?

F 1×10^{8} times

G 1×10^{5} times

H 1×10^{-8} times

J 1×10^{-5} times

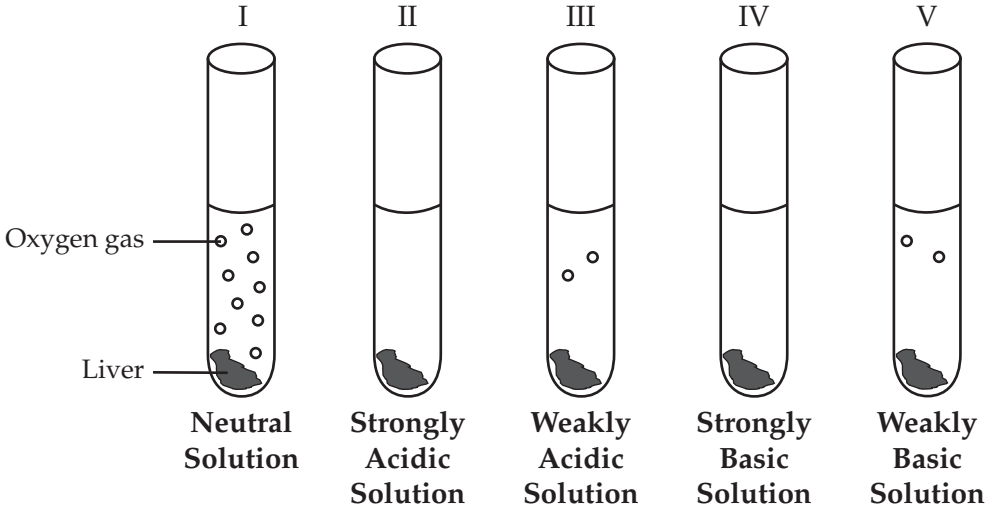
GO ON

Directions

Use the information and the diagram below to answer Numbers 11 and 12.

Catalase is an enzyme found in the tissues of plants and animals, including humans. Catalase helps prevent a toxic buildup of hydrogen peroxide in cells by breaking it down into water and oxygen gas. Several students conduct an experiment to test the effects of pH on the activity of catalase. Each test tube contains a solution of hydrogen peroxide and water at various pH levels. The liver tissue is a source of catalase. The diagram below represents the results of their experiment.

CATALASE EXPERIMENT



11 **Based on the students' results, catalase works best at a pH of**

A 1

B 4

C 7

D 10

12 **Which of the following are the building blocks of catalase?**

F monosaccharides

G nucleic acids

H vitamins

J amino acids

13 **Students tested two cleansers for their effectiveness against bacteria. In their experiment, each cleanser was used on two different household surfaces. The students took samples from each surface before and after using each cleanser. Then they transferred each sample to a culture medium. The students counted the number of bacterial colonies that grew on each culture medium. The results of their test are shown in the table below.**

EFFECTIVENESS OF HOUSEHOLD CLEANSERS

Cleanser	Household Surface	Number of Colonies Before Scrubbing	Number of Colonies After Scrubbing
1	Counter 1	160	2
1	Sink 1	240	4
2	Counter 2	145	28
2	Sink 2	250	60

Which of these would be the best control for their experiment?

A Use only Cleanser 1 on both sinks and counters.

B Use Cleanser 1 on the sinks and Cleanser 2 on the counters.

C Test the number of bacteria on the counters and sinks after scrubbing without using cleansers.

D Test the number of bacteria on the counters and sinks without scrubbing with cleansers.

14 **The kidneys regulate the levels of many chemicals and ions in the body. Which term best describes this process?**

F digestion

G circulation

H homeostasis

J meiosis

Directions

Use the information below to answer Numbers 15 and 16.

The water quality of the Chesapeake Bay is measured by the Chesapeake Bay Water Quality Monitoring Program. Scientists measure the salinity, temperature, pH, and oxygen levels to help determine the health of the Bay. Healthy water also contains appropriate amounts of nutrients. Monitoring water quality helps communities make decisions about the Bay.

15 **Measuring oxygen levels of the Bay provides scientists with information about which process?**

A mitosis

B meiosis

C chemosynthesis

D photosynthesis

16 **Which of these would likely be the <u>most</u> immediate result if oxygen levels in the Bay decreased by 90%?**

F decrease in fish populations

G decrease in salinity levels

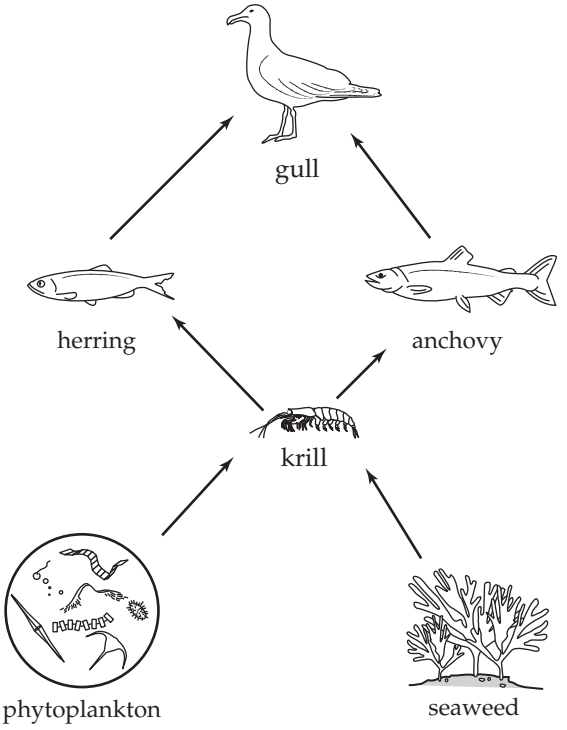
H increase in producer populations

J increase in water temperature

GO ON

17 **The diagram below represents a Coastal Food Web.**

COASTAL FOOD WEB



Global warming causes an increase in coastal water temperatures. Increased coastal water temperature causes a decrease in reproduction of krill. Which of these would most likely experience an increase in population?

A gull

B herring

C anchovy

D phytoplankton

18 **Students working in a biology laboratory use many tools. Which task is correctly paired with the appropriate tool?**

F grouping organisms—Punnett square

G determining genotypes—microscope

H discovering mutations—classification key

J determining relatedness—electrophoresis gel

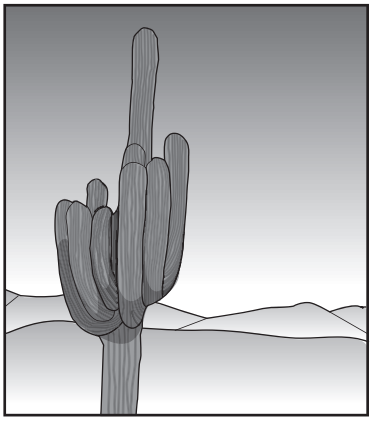
GO ON

Directions

Use the information and the drawing below to answer Numbers 19 through 21.

The desert climate is caused by geographic conditions such as location, high atmospheric pressure, and proximity of mountain ranges. Average desert rainfall amounts are usually less than 50 cm per year. Soil in deserts is coarse, sandy, and rocky. Desert plants and animals have specialized characteristics that help them survive in the harsh environment. An example is the Saguaro cactus. The Saguaro has a shallow root system with a main taproot and other roots that radiate out and collect surface water. The trunk of the Saguaro has the ability to expand while storing water. The sweet-nectar flowers of the Saguaro attract white-winged doves, bats, and other animals. These animals feed on the nectar. They are necessary for cross-pollination. Cross-pollination occurs when the pollen of a flower is carried to a flower on another plant. The illustration below shows the Saguaro cactus.

SAGUARO CACTUS



19 **Which advantage is the most likely result of cross-pollination to Saguaro cacti?**

A disease resistance

B variation within the species

C larger cacti offspring in each generation

D increased number of animals that drink nectar

20 **Which of these adaptations is most important for the Saguaro to survive long periods of drought?**

F deep roots

G sweet nectar

H large flowers

J expanding trunk

21 **Which of these best describes the ecological relationship between white-winged doves and the Saguaro cactus?**

A mutualism

B competition

C parasite-host

D predator-prey

22 **Crops must be able to compete with weeds in order to be successful. Certain crops have been genetically modified to be resistant to specific herbicides. In areas where these crops are grown, the herbicides can be sprayed to kill weeds without damaging the crops. However, weeds in these areas have begun to show resistance to the herbicides.**

The environmental pressure most likely responsible for an increase in the number of resistant weeds is

F herbicides

G non-resistant weeds

H competition with crops

J genes in genetically modified crops

GO ON

23 **Scientists have determined the sequence of most of the human genome. Which of these fields of science will probably benefit the most from this knowledge?**

A chemistry

B geology

C physics

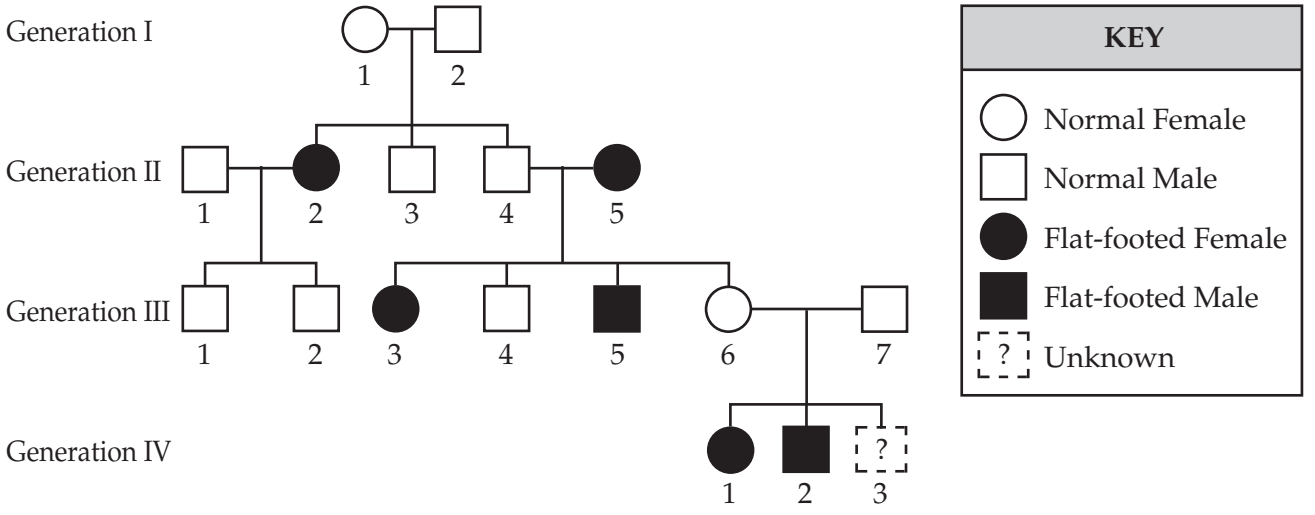
D medicine

Directions

Use the information and the pedigree below to answer Numbers 24 through 26.

In humans, the allele for having feet with normal arches is dominant (A). The allele for flat feet is recessive (a). The pedigree below shows the occurrence of normal arches and flat feet in four generations of a family. In the pedigree, individuals are identified by the generation and individual numbers. For example, Individual 2 in Generation I is identified as I-2.

PEDIGREE FOR INHERITANCE OF NORMAL ARCHES



GO ON

24 **Which of these individuals in the pedigree is a male with the genotype aa?**

F Individual I-1

G Individual II-2

H Individual III-2

J Individual III-5

25 **Individuals III-6 and III-7 have two children and are expecting a third child. Their two children have flat feet. What is the chance that the third child will have normal arches?**

A 25%

B 50%

C 75%

D 100%

26 **Which of these Punnett squares shows the cross between Individual II-4 and Individual II-5?**

F

	A	A
A		
a		

G

	A	a
a		
a		

H

	A	a
A		
a		

J

	A	A
a		
a		

STOP

No test material on this page

Session 2

27 **Depending on the environmental conditions, *Euglena*, a unicellular protist, can act as either a producer or a consumer. *Euglena* will most likely act as a consumer when placed in which of these environments?**

A cool

B acidic

C low-oxygen

D no-light

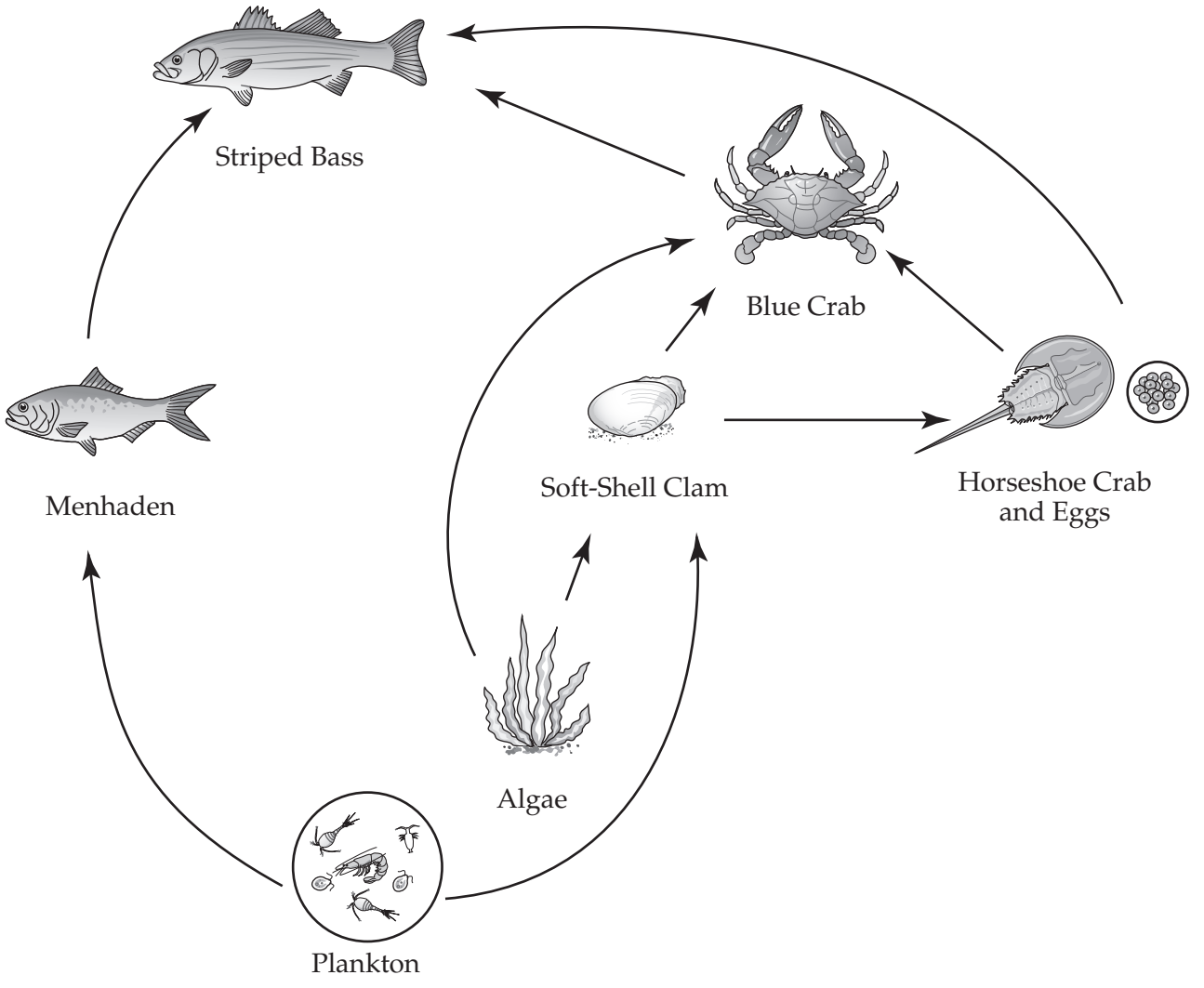
No test material on this page

Directions

Use the information and the food web below to answer Numbers 28 and 29.

Shallow coastal waters provide an essential habitat to a variety of plants and animals. A small part of a coastal food web is shown below.

COASTAL FOOD WEB



28 **Which of these characteristics would provide the best evidence to determine if menhaden and striped bass are closely related?**

F They are both cold-blooded.

G They occupy the same trophic level.

H They both live in coastal waters.

J They have similar DNA sequences.

29 **Students want to compare fish diversity in two different areas of the coast. Which of these sets of items would be most useful for the students to gather for this study?**

A

boat
life jacket
net
fish identification book
field book for recording data

C

boat
eye goggles
net
petri dish
video camera

B

microscope
petri dish
dissection equipment
test tube rack
field book for recording data

D

boat
life jacket
petri dish
dissection equipment
microscope

30 **Which of these best describes the correct sequence in the expression of a trait?**

F trait → gene → enzyme

G gene → protein → trait

H protein → gene → trait

J gene → trait → DNA

Directions

Use the information below to answer Numbers 31 through 33.

Scientists genetically modified a variety of corn to protect it against pests like the corn borer. The corn borer is an insect caterpillar that feeds on the corn stalk, which weakens the stalk and makes it fall over. A new gene in the genetically modified corn causes the plant to produce a chemical that is toxic to the corn borer. Some people are concerned that the genetically modified corn could harm other insects such as the monarch butterfly caterpillar. The monarch caterpillar eats leaves of milkweed plants that might be coated with toxic corn pollen. However, not all researchers agree with the concerns regarding the monarch butterfly caterpillar. They state that it is unusual for large amounts of harmful corn pollen to be found on milkweed leaves. Also, only a small percentage of caterpillars feed on the milkweed plants near corn fields.

31 **What concern do scientists have about the monarch butterfly caterpillar consuming milkweed plants coated with modified corn pollen?**

A The milkweed population would decline.

B The caterpillars could spread the modified pollen.

C The food source of the monarch butterfly could be affected.

D The caterpillars could pass the toxin to the milkweed plants.

32 **Which was most likely introduced into corn that made it pest-resistant?**

F gene

G lipid

H toxin

J protein

33 **Which of these describes the trophic level of the corn borer?**

A carnivore

B herbivore

C producer

D decomposer

34 **When the segment of human DNA that codes for insulin production is inserted into bacterial DNA, the bacterium begins producing human insulin.**

Which of these best identifies the process by which human DNA is inserted into bacterial DNA?

F gene splicing

G crossing-over

H mutation

J cloning

35 **As a response to cellular damage caused by injury, body tissue becomes inflamed, appears red, and feels warm. These changes are the result of blood circulating to the inflamed tissue.**

In response to the increase in temperature, which of the following is most likely to occur in cells surrounding the damaged tissue?

A increase in the mutation rate of the tissue

B decrease in oxygen flow through the tissue

C increase in the metabolic rate of the tissue

D decrease in carbon dioxide use by the tissue

Directions

Use the information below to answer Numbers 36 and 37.

Methyl mercury is a toxic substance that can harm the nervous system. Some fish are contaminated with high levels of methyl mercury. In many places, these fish are an important food source. Experiments are being conducted to determine how many meals of contaminated fish can be safely consumed. The table below shows the concentration of methyl mercury in the fish and the number of meals that can be safely consumed per month.

METHYL MERCURY IN CONSUMABLE FISH

Concentration of Methyl Mercury in fish (ppm*)	Number of meals safely consumed per month
0.05	25
0.08	15
0.12	10
0.25	5
0.40	3
0.80	2

***ppm= parts per million**

36 **The table below shows the mean mercury concentrations in fish.**

MERCURY CONCENTRATION IN FISH

Freshwater Fish	Mean concentration of Methyl Mercury (ppm*)	Average size of mature fish (length, mass)	
Common carp	0.11	30–63 cm	4.5 kg
Channel catfish	0.09	36–53 cm	9.0 kg
Largemouth bass	0.51	30–41 cm	1.2 kg
Yellow perch	0.26	38–46 cm	1.1 kg

***ppm= parts per million**

According to this table, which fish would be safest to eat?

F common carp

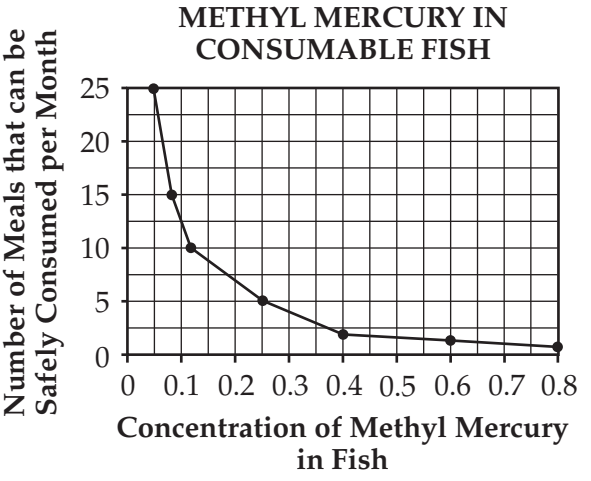
G channel catfish

H largemouth bass

J yellow perch

GO ON

37 **The data collected during this experiment are summarized in the graph below.**



The graph has been constructed incorrectly. Which of these needs to be corrected in order to improve the graph?

A The axes are labeled with inappropriate intervals.

B The dependent and independent variables are on wrong axes.

C The title is inconsistent with the investigation.

D One or both axes are missing units.

38 **Which of these will most likely reduce the acidity of rain in an area?**

F decrease use of pesticides

G improve water treatment plants

H decrease emissions from power plants

J decrease the number of trees in an area

Directions

Use the information below to answer Numbers 39 and 40.

Many bird species in the forests of eastern North America have very large geographic ranges. Bird species in tropical forests have very small geographic ranges. Many forest areas within the ranges of these birds are being destroyed. Scientists believe that the destruction of forests affects birds with small ranges more than birds with large ranges.

39 **As a result of the destruction of forests, birds with a small geographic range are most likely to**

A lose their specific niche

B adapt to a new environment

C lose their ability to navigate

D become less susceptible to disease

40 **Which of these is an abiotic factor in both North American and tropical forest ecosystems?**

F age of trees

G intensity of light

H number of consumers

J number of producers

41 **Both DNA and RNA**

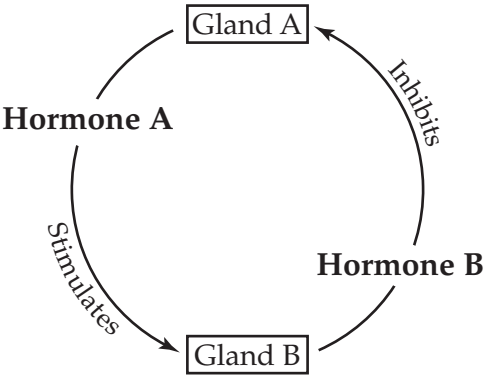
A contain phosphate

B contain amino acids

C are a double helix

D are inorganic

42 **Below is a diagram that represents the relationship between two glands.**



This is an example of

F polarity

G feedback

H natural selection

J anaerobic respiration

Directions

Use the information below to answer Numbers 43 and 44.

In an ocean environment, marine life is most abundant in the euphotic zone. This zone extends from the surface waters to a depth of 200 meters, the deepest depth that sunlight can reach. It is in this range that phytoplankton capture energy from the sun. Although they are microscopic organisms, phytoplankton are the foundation that supports the marine food web.

43 **Through which process do phytoplankton use energy from the sun to make their food?**

A chemosynthesis

B photosynthesis

C evaporation

D respiration

44 **Which trophic level is most likely missing from an ocean floor food web at a depth of 800 meters?**

F carnivores

G decomposers

H producers

J scavengers

GO ON

No test material on this page

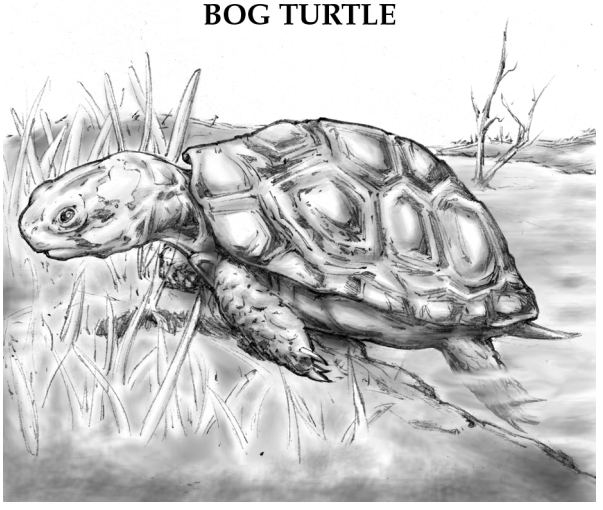
Directions

Use the technical passage and the drawing below to answer Numbers 45 through 48.

BOG TURTLES

One of the smallest turtles in the world is found along the east coast of the United States from Massachusetts to Georgia. The bog turtle, measuring only 100 millimeters in length, was unknown in Maryland before 1941. A drawing of a bog turtle is shown below.

BOG TURTLE



Studies conducted in recent decades verified that Maryland was included in the range of the bog turtle. It was often misidentified because the colorful orange patterns on its head and neck resembled other turtles. To learn more about the bog turtle, scientists conducted a survey of its habitat sites. The results of the survey led to a more thorough investigation of bog turtle sites by the Maryland Department of Natural Resources. As a result, the number of sites increased from one verified site in 1944 to 177 verified sites in 1984.

Known bog turtle sites are less than one acre in size. Bog turtles prefer to live in areas of low-lying wetlands, swamps, and meadows that are soft and muddy. These habitats aid in body temperature regulation and egg incubation. Ground water springs provide an area where the turtles can spend winter without the threat of freezing. The vegetation in the bog turtle habitat consists of cattails, sphagnum moss, and various native grasses. Although the bog turtle population may never have been large, habitats since precolonial times have declined because of development and changing farm practices.

The state of Maryland added the bog turtle to the list of endangered species in 1972. Steps to protect its habitat include land use management, bog preservation, private landowner cooperation, management of invasive plant species, as well as captive breeding programs. By adding federal protection to the existing protection provided at the state level, one of the smallest turtles in the world may continue to survive.

GO ON

45 **Which is one reason that the estimates for the bog turtle population may be inaccurate?**

A Bog turtles are small and can hide well.

B There are too many turtles to count accurately.

C Bog turtles are mistaken for other types of turtles.

D Population data from precolonial times is incomplete.

46 **Which of these processes would most likely cause new color patterns on the head and neck of bog turtles?**

F mitosis

G mutation

H succession

J replication

47 **Which of these is responsible for the color patterns on the head and neck of the bog turtle?**

A carbohydrates

B diet

C habitat

D proteins

48 **Some marshes and swamps eventually become homes to communities that include mature trees. What is this process called?**

F commensalism

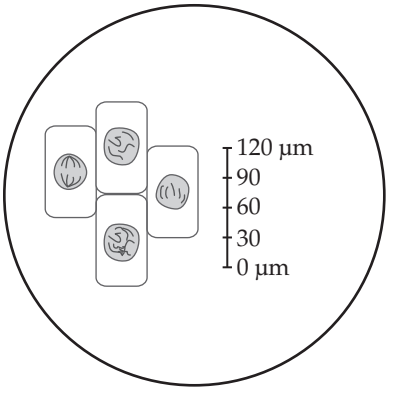
G homeostasis

H mutualism

J succession

49 **A student sketches some onion root tip cells as they appear when viewed through a light microscope. The student's sketch is shown below.**

ONION ROOT TIP CELLS



(400X)

Which of these measurements best represents the actual length of the onion root tip cells?

A 35 µm

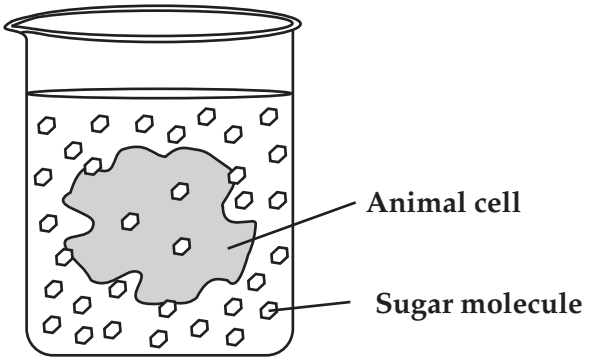
B 55 µm

C 75 µm

D 95 µm

50 **The diagram below shows an animal cell in a beaker containing a solution of sugar and water. The cell membrane is permeable only to water.**

ANIMAL CELL IN SUGAR AND WATER SOLUTION



Which statement describes the relationship between the animal cell and the contents of the beaker?

F There is a higher concentration of water inside the cell than outside the cell.

G There is a higher concentration of sugar inside the cell than outside the cell.

H There is an equal concentration of water inside the cell as outside the cell.

J There is an equal concentration of sugar inside the cell as outside the cell.

Directions

Use the information and the chart below to answer Numbers 51 and 52.

Several students are conducting an experiment to test the effect of exercise on heart rate. Students do 20 sit-ups in one minute of exercise. The data chart below shows the heart rate at one-minute intervals for each student.

HEART RATE DURING EXERCISE

Student	Heart Rate (bpm*)				
	1 min. of exercise	2 min. of exercise	3 min. of exercise	4 min. of exercise	5 min. of exercise
1	88	98	102	110	110
2	92	96	103	115	118
3	87	100	112	112	130
4	93	109	115	120	122
5	90	93	101	112	112
Average	90	99	107	114	118

*bpm = beats per minute

51 **Which of these is the dependent variable?**

A time

B heart rate

C type of exercise

D number of sit-ups

52 **The students decide to ignore any results that were too far above or below their prediction. They repeat these trials until a value closer to their prediction is obtained. The students' decision to ignore data and repeat trials affects the experiment by**

F introducing bias

G decreasing controls

H increasing accuracy

J eliminating variables

STOP

53 **A new species is introduced into an area. This can have harmful effects on species already inhabiting the area. The harmful effects are most likely a result of**

A succession

B mutualism

C competition

D commensalism

54 **Below are parts of the mitochondrial DNA codes for the American black bear, the giant panda, the red panda, and the raccoon.**

MITOCHONDRIAL DNA CODES

Organism	DNA Codes
American black bear	ATT GGA GCA GAC TTA
Giant panda	ATT GGC ACT AAT CTA
Red panda	ATT GGA ACT AAC CTT
Raccoon	ATC GGA TCT AAC CTT

Based on this information, which two species are most closely related?

F the American black bear and the giant panda

G the American black bear and the raccoon

H the red panda and the raccoon

J the red panda and the giant panda

GO ON

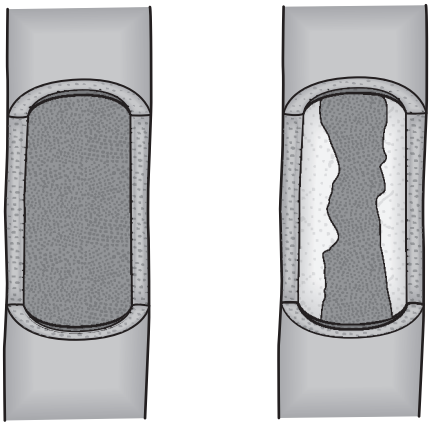
No test material on this page

Directions

Use the information and the diagram below to answer Numbers 55 and 56.

Arteriosclerosis is a disease which clogs arteries in the human body. In arteriosclerosis, artery walls become thick. Fatty deposits build up on inner walls of arteries. This condition reduces the ability of arteries to perform their function. The diagram below shows a comparison between a healthy artery and one with arteriosclerosis.

COMPARISON OF TWO ARTERIES



Healthy Artery | **Artery With Arteriosclerosis**

55 **Which body function is <u>most</u> affected by arteriosclerosis?**

A circulating blood to tissues

B assembling amino acids into proteins

C replacing damaged cells with new cells

D breaking down food particles into molecules

56 **A healthy circulatory system is able to deliver excess oxygen and nutrients to cells. Which cell organelle requires oxygen to carry out cellular respiration?**

F ribosomes

G nuclei

H mitochondrion

J membranes

57 **Which of the following pairs of materials is required for a cell to carry on respiration?**

A water and oxygen

B glucose and oxygen

C water and carbon dioxide

D glucose and carbon dioxide

58 **Prokaryotic cells possess all of the following except**

F cell membrane

G ribosomes

H cell wall

J nuclear membrane

59 **All living things need nitrogen. The nitrogen gas in Earth's atmosphere must be changed into ammonia before most living things can use it. Which of these organisms can change nitrogen gas into ammonia?**

A bacteria

B mold

C moss

D yeast

60 **Water dissolves many substances. This occurs because water has**

F surface tension

G polarity

H specific heat

J cohesion

61 **Red-green color blindness affects about 7.0% of the human male population. It affects approximately 0.4% of the human female population. These data suggest that red-green color blindness is a**

A dominant trait carried on the Y chromosome

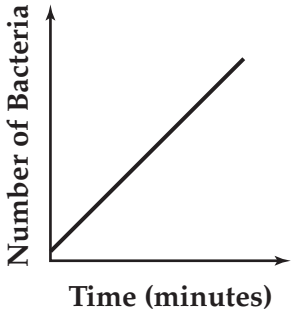
B dominant trait carried on the X chromosome

C recessive trait carried on the Y chromosome

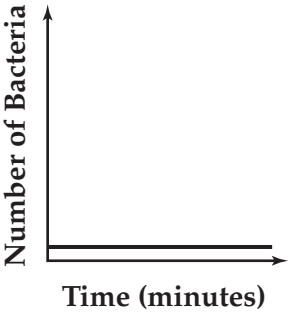
D recessive trait carried on the X chromosome

62 **A population of bacteria, starting with a single cell, can double in number every twenty minutes. Which of the following graphs best shows the relationship between number of bacteria and time?**

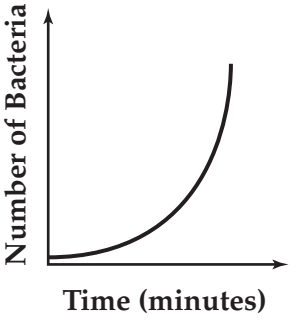
F **BACTERIAL GROWTH OVER TIME**



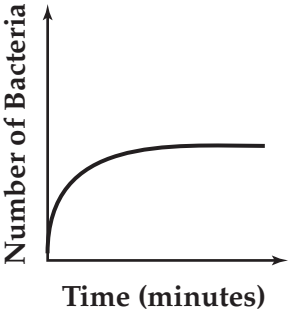
H **BACTERIAL GROWTH OVER TIME**



G **BACTERIAL GROWTH OVER TIME**



J **BACTERIAL GROWTH OVER TIME**



63 **The characteristics listed below can be used to describe some molecules.**

1. inorganic
2. supplies energy and fiber
3. component of plant cell walls
4. part of DNA
5. made of nucleotides

Which of these sets of characteristics describes a carbohydrate?

A 1–3–5

B 2–3–4

C 2–4–5

D 1–3–4

Directions

Use the information below to answer Numbers 64 through 66.

Scientists have observed that when a largemouth bass tries to eat a whirligig beetle, the fish is likely to get more than just a meal. Once inside the mouth of a bass, the beetle releases a foul-tasting substance into the fish's mouth. The fish responds to this by swishing the beetle around in its mouth, spitting the beetle out into the water, and scooping the beetle back into its mouth. The bass is exhibiting a "flushing" behavior. Unlike other insects, whirligig beetles do not release all of their foul-tasting substance the first time they are pulled into a predator's mouth. Each time the bass scoops the beetle back into its mouth, more of the substance is released. The bass must exhibit "flushing" again and again. If the bass tires of "flushing" before the beetle runs out of its foul-tasting substance, the beetle can avoid becoming the bass's next meal.

64 **The ecological relationship between largemouth bass and whirligig beetles is best described as**

F predator-prey

G parasite-host

H mutualism

J commensalism

65 **The ability of whirligig beetles to gradually release a foul-tasting substance most likely results from**

A mutation

B succession

C natural disasters

D recombinant DNA

66 **Which research question about the largemouth bass and whirligig beetle would best match the scientists' observations?**

F How long do fish spend rinsing their food?

G What is the favorite food of a largemouth bass?

H Which insects produce the most foul-tasting substances?

J Does the slow release of a foul-tasting substance increase survival?

67 **In deep ocean trenches, bacteria produce organic materials from inorganic compounds through the process of**

A respiration

B decomposition

C photosynthesis

D chemosynthesis

GO ON

Directions

Use the information below to answer Numbers 68 and 69.

Scientists determined that excess fertilizer from farms entered a shallow lake. The fertilizer caused an increase in aquatic plants in the lake and then a decrease in oxygen in the water. Next, organic debris collected on the bottom of the lake. Over several years, the lake gradually filled in with organic sediment.

68 **One species of aquatic plant found in the lake has 84 chromosomes in each cell. As nutrient levels increased, the population of this species increased through vegetative reproduction. How many chromosomes were in the cells of the offspring?**

F 21

G 42

H 84

J 168

69 **As the fertilizer levels increased, the population of consumers in the lake declined. Which change most likely caused this decline?**

A increase in light intensity

B decrease in available oxygen

C increase in temperature

D decrease in carbon dioxide

GO ON

Directions

Use the information below to answer Numbers 70 and 71.

Plants grow in various environments. Some plants, like mangroves, grow in salty wetlands. Mangroves have specialized structures that prevent salt from entering their cells. Other mangroves have specialized glands that can excrete excess salt.

70 **Glands that excrete salt in the mangroves are examples of**

F meiosis

G osmosis

H adaptations

J successions

71 **Which organelle in mangrove cells converts solar energy into useable energy?**

A nucleus

B ribosome

C chloroplast

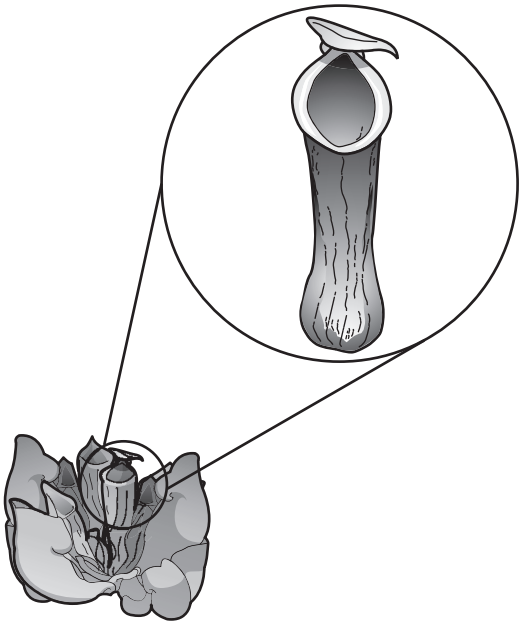
D mitochondrion

Directions

Use the information and the drawing below to answer Numbers 72 and 73.

The pitcher plant is a carnivorous plant that consumes various small organisms such as spiders and frogs. The pitcher plant is often found in areas with soil that is very acidic and contains few nutrients. The pitcher plant consumes organisms that help supply the plant with nutrients that are not in the soil. A diagram of the pitcher plant is shown below.

PITCHER PLANT



72 **In which soil pH range are pitcher plants most likely found?**

F 4.5–5.5

G 7–8

H 10.5–11.5

J 13–14

73 **Which of these best describes the relationship between the pitcher plant and the insects?**

A symbiotic

B competitive

C parasite-host

D predator-prey

GO ON

74 **In humans the trait of having freckles (F) is dominant to not having freckles (f).**

Which genotype and phenotype are correctly paired?

F FF–no freckles

G Ff–no freckles

H Ff–freckles

J ff–freckles

75 **What process produces male and female reproductive cells in plants?**

A mitosis

B meiosis

C replication

D fertilization

76 **An increase in the use of fossil fuels has increased the amount of sulfur compounds in Earth's atmosphere. Which of these is a direct result of the increased amount of sulfur in the atmosphere?**

F an increase in acid rain

G an increase in severe storms

H an increase in global warming

J an increase in the rate of ozone depletion

STOP

BIOLOGY

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